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Beirut, 3-8 March 1975

STUDY ON FOOD PROCESSING IN THE KINGDOM OF SAUDI ARABIA[1/]

prepared by
Industrial Studies and Development Centre
Riyadh

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Regional Meeting on the Development of Selected Branches of the Food Industry in Selected Countries of the Middle East

Beirut, Lebanon, 2 - 8 March 1975

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Summary

This study was prepared on the basis of letters of reference numbers 102/8/1510 and 102/8/1512 dated 13/4/1394 H (6/5/1974 A.D.) forwarded to the Technical Co-operation Administration of the Ministry of Trade and Industry, and the Industrial Studies and Development Centre, based (wherever possible) on the outline set out in the ESCWA circular attached to the above mentioned letters.

This study was prepared for presentation at the meeting to be held in Beirut for the determination of regional and national priorities in the development of feed processing in the Middle East.

The sectors of food processing to be talked about are: sugar, vegetable oils and fats, animal feed, fruits and vegetables and baby food. Hense, the study deals with industrial projects, whether existing or under-way, or such projects for which initial studies have been made only in the above mentioned sectors.

The data for this study has been derived either from the factual findings of the visits made to food factories in the Kingdom of Saudia Arabia, from the factual findings of the studies made by the Industrial Studies and Development Centre or from the files of such factories kept at the General Administration of Industry - Ministry of Industry and Trade.

Sugar Processing Industry

A factory for refining raw sugar will be established in Jedda, with a production capacity of 100,000 tons of refined sugar, per year.

The capital required for such project has been estimated at 54,490,000 riyals approximately, 25 percent of which is the share of the English Company, Tate and Lyle.

Initially, raw sugar will be imported to the Kingdom from abroad. Refining will be carried out in the proposed factory. In the long run, however, raw sugar will be produced locally. The sugar cane plantation will be developed in Jizan, in the south of the Kingdom. Once this project is implemented, the entrepreneurs will undertake another one for the extraction of raw sucrose from sugar cane in the same area.

The following tables show the quantities of imported refined sugar to the Kingdom during the period 1961-1972 and the expected quantities of raw sugar to be refined during the coming five years.

Table 1

Imported Refined Sugar:

Year	Value in Thousands of Riyals	Quantity in Tons
1961	24.955	71.767
1962	6.942	15.920
1963	21.606	18.732
1964	45.778	76.400
1965	20.782	56.030
1966	37.874	120.393
1967	8.474	25.362
1968	27.091	72.258
1969	23.470	68.742
1970	32.159	69.120
1971	48.147	80.467
1972	70.267	105.568

Source: Foreign Trade Statistics

Table 2

Sugar to be Refined Locally

Year	Quantity in Tons
1974	96.700
1975	103.500
1976	110.000
1977	117.500
1978	125.000

It is evident from the above projection that the plant proposed to be established in the Kingdom, for sugar refining, will be adequate for covering

for the time being, local consumption of sugar. Expansion of sugar cane plantations in large quantities, and the possibility of successful growing of sugar beet in the eastern area, will open the way for other ventures in sugar projects, either for the extraction and refining of raw materials in order to meet the increase in the demand and export the excess of sugar produced, or the exportation only of raw materials, after being extracted from sugar cane or sugar beet.

Vegetable Oils and Fats Industry

The Industrial Studies and Development Centre - Riyadh, is preparing a study on the economics of processing vegetable oils and fat at a production capacity of 5,000 tons/year of oil, 20,000 tons/year of fat.

The following table shows the quantities of imported vegetable oils and fat during the period 1965-1972:

Table 3

Imports of Vegetable Oils and Fats

Year	Vegetable Oils (in tons)	Fats (in tons)
1965	3374	17181
1966	3665	14413
1967	6005	19668
1968	4257	19572
1969	5923	14374
1970	4437	18037
1971	9602	22713
1972	7136	23066

Source: Foreign Trade Statistics

Projecting the actual demand, the following table was estimated:

Table 4

Estimates of the Demand of Vegetable Oils and Fats

Year	Vegetable Oils (in tons)	Fats (in tons)
1973	7993	23738
1974	8521	24951
1975	9049	26164
1976	9577	27277
1977	10105	28590
1978	10633	29803
1979	11161	31016
1980	11689	32229
1981	12217	33442
1982	12745	34655

In view of the success of the growing of sunflower in the south of the Kingdom and the possibility of expanding its production, and due to the fact that its seeds can yield, by extraction, vegetable fats and oils, we find it encouraging to propose (although economic studies are not yet integrated) giving top priority to ventures in vegetable oils and fats projects.

Animal Feed Processing Industry

1. Demand for Animal Feed

A. Poultry Feed

The demand for this kind of feed comes from places and centres of poultry husbandry and breeding for meat and eggs purposes. The Kingdom has witnessed during the last few years an expansion in the husbandry and breeding of poultry and production of egg , which led to an increasing demand for feed, including concentrated processed feed.

The following table shows the quantity of feed required for consumption in the years 1390 H and 1396 H (1970 and 1976):

Table 5

Demand of Animal Feed

Description	Yr. 1390 H (1970)	Yr. 1396 H (1976)
Number of laying hens	840.000	910.000
Quantity of feed needed yearly for consumption/ton	21.000	41.000
Number of chickens	4,350.000	7,350.000
Quantity of feed needed yearly for consumption/ton	13.000	30.000
Total of annual feed consumption in tons	34.000	71.500

Source: Estimates by Arthur De Lytle

B. Livestock

(a) Estimated Demand

This kind of feed is usually consumed by cows, calves and sheep, for two fundamental objectives, namely, fattening and milk. The use of concentrated feeds, however, is currently restricted to governmental fields and farms and private rural stations for raising cattle. As for the rest of the domestic animals in the Kingdom, they depend on clover (berseem), grasses and a blend of cereals such as maize and barley.

According to estimates made by the World Food and Agriculture Organization, FAO, of the number of domestic animals in the Kingdom of Saudi Arabia, it has been found that in 1969, the number of cows and calves was 180,000 head, and that of sheep was about 3,000.000 head. Assuming that the rate of growth is 10% (according to the average rate of growth in the previous years), the number of cows and calves in 1976 will be 306.000 head and that of sheep 3,710.000 head.

Supposing that 15% (=45900) of the cattle and 5% (=160500) of the sheep feed on concentrated feed, the estimated demand for animal feed in 1976 will be approximately 53.5 thousand tons.

Table 6

Existing Factories' Data

Name of Factory	Start of Operations	Location	Capital		Production Capacity		Type of Production	
			1973	1975	1973	1975	Kind	Purpose
Saudi Arabian Feed Co.	1968	Dammam	270.000	2,500.000	9.500	60.000	Livestock and Poultry Feed	Local Marketing
Feed Co. Jedda (Faqih)	1970	Jedda	1,500.000	-	12.000	-	Poultry Feed	Private Farm
Poultry Arab Co.	1972	Taif	400.000	-	3.500	-	Poultry Feed	Private Farm
Al-Riyadh Poultry Co.	1974	Riyadh	-	785.000	-	7.200	Poultry Feed	Local Marketing
Saudi Co. for Agricultural Development	1975	Riyadh	-	5,000.000	-	12.000 feed 6 million chickens	Poultry Feed chicken meat	Private Farm

2. Local Production

A. Existing Factories:

In the Kingdom, there are several factories which produce poultry feed but until now none of them produced livestock feed. Some of the existing factories are thinking of expanding their production capacity as to include processing of livestock feed.

Saudi Arabian Feed Co. expects to utilize its maximum production capacity within three years as from the starting date of production. During the first year of expansion (1975), production will reach 25.600 tons of feed, of which 19.600 tons will be poultry feed and 6.000 tons will be animal feed, produced in the Kingdom for the first time. Assuming that production capacity in Dammam will reach in 1976, 42.500 tons of feed divided into 29.750 tons of poultry feed and 12.750 tons of animal feed in addition to the capacities of other factories. The total capacity of the factories, in 1976 A.D./1396 H, will be:

1. 64.450 tons of poultry feed
2. 12.750 tons of animal feed

This shows that the local production in 1976 will cover 90% of the Kingdom's need of poultry feed and only 20% of the Kingdom's need of concentrated livestock feed.

B. Production Cost Incurred by Saudi Arabian Feed Company/Damman

Details of production costs incurred by Saudi Arabian Feed Company/ Dammam for the production of 3600 tons of poultry feed in 1388 H (1968) are as follows:

(a) Fixed Costs

Depreciation of buildings and installations	3%	4500
Depreciation of equipment and machines	10%	4930
Depreciation of vehicles and transportation	20%	8000
Depreciation of funiture	20%	2000
Outlay of institution	20%	4000
Maintenance	2.5%	2233
Others		16800
Non Saudi Arabian		75600
		118,063

(b) Variable Costs

Raw Material	2198681
Wages of Workers	24000
Electric Power	9000
Water Supply	1800
Other Variable Costs	20033
Fuel	7200
	2,260,714

Total of fixed and variable costs

118063 + 2260714 = 2378777 Riyal

Average cost / ton = 2378777 + 3600 = 660 Riyal / ton

Production cost / ton jumped from Riyals 660 to Riyals 853 / ton, although production capacity increased from 3600 tons in the year 1388 H to 5600 tons in the year 1391 H and 9000 tons in the year 1393 H, due to a rise in the prices of imported raw materials and their transport costs.

3. Raw Materials

Raw materials used in feed factories are imported from the United States, but certain materials used in concentrated feeds are imported from Lebanon.

It is expected that the rate of raw materials to be imported in the future will decrease once some food industries have been established, such as flour mills, silo extraction of molasses, conservation of dates, processing of sugar, vegetable fats and oils, and agricultural expansion in the production of variety of cereals, namely various species of corn, wheat and barley has been realized.

A. Kinds of Raw Materials:

(a) Vegetable Products: We mention here barley, wheat and maize which can be provided locally side by side with the agricultural expansion of cereal crops.

(b) By-products of certain industries: like soya cakes which can be locally supplied when and if the vegetable oil industry is established in the country.

(c) Industrial products: These are represented in concentration elements, chemical compounds and anti-organics. The need for the importation of such kinds of materials will continue for a long time.

B. Average Price of Raw Materials:

(a) Corn (various species), wheat and barley - price per ton: 420 riyals.

(b) Soya and concentrated feeds - price per ton 1300 riyals.

4. Problems Encountered by Feed Factories in the Kingdom

The rise of the prices of imported raw materials and the lack of media of transportation for carrying such materials from the countries of origin to the Kingdom are the basic problems. However, the technical and economic agreements being concluded between the Kingdom and certain industrial countries, at present, are likely to put an end to such problems.

5. Recommendations

Expansion in the various fields of development, which the Kingdom is experiencing today, particularly in the field of animal husbandry tend to give great importance to investment in feed processing and it is considered among the sucessful projects which, along with the regulation of economic diversification, would help in reaching high levels of animal husbandry development. Investment in new projects of poultry feed, however, may appear of no use due to the fact that the existing production capacity can meet all demands in the near future by operating on the basis of two shifts and it is preferable to focus at present, on investment in animal food projects.

Tomato Sauce and Juice Processing

1. Introduction:

A factory for processing tomato sauce and juice was established on a site in the Industrial Zone, Riyadh, in the early months of the year 1394 H, 1974 A.D.

The capital of this factory is riyal 8.6 million.

The production capacity of this project amounts to 1560 tons of tomato sauce and 1800 tons of tomato juice per annum.

The factory will establish a production plant for making and processing tinplate cans, capital being riyals 2.2 million and the production capacity of 48 million cans per year.

In addition to the Al-Riyadh factory there will be established in the area of Al-Qaseem another factory with a capital of 3.3 million riyals and with a production capacity of 3600 tons per annum (3000 tons of sauce and 600 tons of juice).

2. Raw Material

The raw material used in tomato sauce and juice is fully red high quality fresh tomato. The only ingredient added in the processing of tomato juice is pure table salt at a ratio of 3.5%.

As it is estimated, the existing plant requires about 18.000 tons of fresh tomato annually.

The factory owns a plantation which covers 30% of the required quantitity of tomatos. The remaining part is purchased from the local market. In 1970/71 the quantity of tomatos produced in the Kingdom was estimated to be 70.000 tons.

Fresh tomato prices fluctuate in accordance with supply and demand, like prices of other commodities, under the influence of the policy of free economy followed in the Kingdom. The economic factors of the existing project, however, do not allow the purchase price of one ton of fresh tomatoes to exceed 450 Riyals.

The quantity of tomatos locally purchased created certain problems for the project due partly to lack of uniformity of the entire quantity purchased with good quality specifications, and partly to occasional rise and fluctuation of prices. In studying the various ways of supplying the existing factory with raw material, it had been found that it would be best for the factory to own a farm where the needed quantity and quality can be met. The State may grant the factory the necessary land for such purposes.

3. Production Capacity

A. Brief Description of Production Operations

Tomato juice and sauce pass through several processing stages before they reach the final form available in the market.

(a) First Stage: This includes delivery of tomatoes, washing of the heads to remove sticking dirt and sorting them out in order to use the good heads and throw away the bad ones.

(b) Second Stage: At this stage, operations include mashing, straining, exposing to evaporation and concentration. Cans and lids are also sterilized.

(c) Third Stage: This stage has to do with canning and soldering.

It should be noted that tomato juice passes through the same stages as

tomato sauce except those operations of evaporation and concentration. The equipment used in the above mentioned stages is made of stainless steel and all the steps of processing are carried out automatically.

4. Labour

The existing project requires forty-eight workmen including thirty-nine non-technicians, six technicians and three mechanics. The factory was established to operate 150 days yearly. It needs an administrative staff of fourteen persons.

5. Final Product

A. Conformity with Specifications:

The scientific specifications observed in the Kingdom are applicable to the final product. When the entire dry substance found in the sauce ranges between 28% and 30%, it means that this conforms with good specifications (other kinds of various good qualities are available in the markets of the Kingdom with 22% of dry substance to begin with). The dry substance dissolved in the tomato juice constitutes 5.8% in addition to a proportion of pure salt which reaches 3.5%.

B. Quantity:

The sauce product of the factory, of an output of 1560 tons, is filled in containers of net weight of 70, 150 and 500 grams. The tomato juice product, of an output of 1800 tons, is filled in containers of net weight of 170 grams.

The following tables show the quantities of tomato juice and sauce imported into the Kingdom during the years 1969 to 1971 and the demand for 1974 to 1978.

Table 7

Imported Quantities of Tomato Juice and Sauce

	1389/1969	1390/1970	1391/1971	1392/1972
	Qt/ton	Qt./ton	Qt./ton	Qt./ton
Sauce	11782	8971	12523	10232
Tomato Juice	1358	2059	3109	

Source: Foreign Trade Statistics

Table 8

Demand for Tomato Sauce and Juice

Year	Sauce (in tons)	Juice (in tons)
1394/74	13884	1831
1395/75	14296	1900
1396/76	14758	1969
1397/77	15200	2038
1398/78	15652	2107

Costs of Production:

In view of the fact that the existing plant in the Kingdom has not been established long enough to determine the accurate costs of production, it will depend here on the structure of the costs estimated in the economic study of the project, along with the adjustment of the cost of the raw material in accordance with the prices prevailing at the time of the preparation of this study.

(a) Fixed Expenses

First: Wear and Tear

- Depreciation of buildings and installations by 5% of the cost	9000
- Depreciation of equipment and machines by 10% of the cost	140000
- Depreciation of vehicles and means of transport by 20 percent of the cost	4800
- Depreciation of funiture by 10% of the cost	800
- Depreciation of institution outlay by 20% of the cost	10000
Second:	
- Salaries of employees, administrators and engineers	24000
Third:	
- Other fixed costs	50000
Total of fixed costs	238600

(b) Variable Costs

- Direct raw material	6900000
- Wages of Workers (labour)	59000
- Electric power	7000
- Fuel	6000
- Water supply	5000
Total of variable costs	6977000
Total of expenses	7215600

Since the production capacity of the factory is divided between processing of sauce and that of juice, and due to the fact raw materials constitute the greater part of the costs in the ratio of 4:1, the following steps will be adopted in calculating the costs of the production of tomato juice and sauce.

Total of fixed and variable costs	7,215.600
Cost of direct raw materials	6,900.000
Fixed and variable costs including costs of raw Materials	315.000

Average cost per processed ton of sauce and juice excluding costs of raw materials:
315.000 ÷ 3360 = Riyals 94/ton

Cost of raw material used for sauce:
6,900.000 x 4/5 = 5,520.000 Riyals

Cost of raw material used for juice:
6,900.000 x 1/5 = 1,380.000 Riyals

Average share of each processed ton of sauce, of the cost of raw material:
5,520.000 ÷ 1560 = 3538 Riyals

Average share of each processed ton of juice, of the cost of raw material:
1,380.000 ÷ 1800 = 766 Riyals

Average cost of processed sauce:
3538 + 94 = 3632 Riyal/ton

Average cost of processed juice:
766 + 94 = 860 Riyals/ton

6. Comparison of Local Product with Imported Product

Imported product does not constitute any tangible competition with local product. The cost of local product - average cost being Riyals 3632/ton of sauce and Riyals 860/ton of juice - offers it a firm stand in the field of competition. While the price of one ton of imported sauce reaches approximately Riyals 4200 and that of juice Riyals 2320, we find that the average sale price of locally produced sauce reaches Riyals 4060/ton, and that of locally produced juice reaches Riyals 2280/ton, not to mention the quality of imported sauce

available in the market which does not always match that of locally produced sauce. There is more demand, however, for imported product since it is older in the markets and better known. Still this can be overcome by means of publicity and advertising and by adopting appropriate marketing methods.

7. Recommendations

- Processing of tomato juice and sauce is considered to be an important step towards economic expansion in the Kingdom. In view of the fact that most of the raw materials are available locally, investment in these projects deserves a high degree of priority.

- By comparing the present production capacity of tomato sauce and juice and that to be attained in the near future (6960 tons yearly) with the demand expected within the coming five years (18200 tons approx.), it seems necessary to increase the production capacity either by means of expanding the existing projects or by establishing new plants.

As a general policy of the State, having as its aim the expansion of the industrial base in the Kingdom and reclamation of land, it may seem appropriate to establish more than one plant in the Kingdom, to be distributed among such areas where tomatoes are grown since:

- Growing of tomato will extend to many areas in the Kingdom.
- The factory owners will be usefully assured of obtaining new material from areas not far from the plant and the farmers as well will be assured that their products will be sold.
- A great opportunity will be open to free competition for the maintenance of good quality, reduction of costs and deprivation of plants enjoying a monopoly.

Baby Food Processing

The Centre has carried out certain studies to estimate the demand for baby food made from cereals, in order to evaluate the idea of establishing a baby food industry in the Kingdom.

The following table shows the expected demand for fruit and vegetable baby food:

Table 9

Baby Food's Demand

Year	Demand Expected (in ton)
1392	324
1393	256
1394	392
1395	431
1396	474
1397	521
1398	573
1399	620
1400	672

It has become clear from field survey, that most of the imported baby food is the product of the two American Companies: Heinz, which covers 90% of the demand and Gerber which covers 10%. The study has recommended that a Baby Food industry is not to be established in the Kingdom, for the following reasons:

1. Such industry requires long experience in this field.
2. Due to its delicacy, this industry requires laboratories and strict hygienic supervision.
3. Falling short of competing with world leading companies which produce millions of tons yearly.
4. The demand is still small and not encouraging enough to urge an international company to participate in projects such as these.